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Retrograde flexible ureteroscopy-assisted retroperitoneal laparoscopic ureteroureterostomy for refractory ureteral stricture: A case report

Nobuo Tsuru*, Soichi Mugiya, Shigenori Sato

Department of Urology and Endoscopic Surgery Center, Suzukake Central Hospital, Hamamatsu, Japan

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ABSTRACT

INTRODUCTION: Laparoscopic ureteroureterostomy (UU) is a preferred and valid minimally invasive procedure for treatment of benign ureteral strictures. In some cases with chronic inflammation or after repeated endoscopic ureteral surgery, it is difficult to identify the location of a ureteral stricture.

PRESENTATION OF CASE: We report a case of 48-year-old man with an impacted stone after laparoscopic partial nephrectomy. Although transurethral lithotripsy (TUL) was performed, the ureteral stricture did not improve by subsequent endoscopic ureteral Holmium laser incision and balloon dilation.

DISCUSSION: To simultaneously identify the exact location of the constriction, we performed retroperitoneal laparoscopic ureteroureterostomy with intraoperative observations via super-slim flexible fiberoptic ureteroscopy retrograde.

CONCLUSIONS: Accurate identification of the ureteral stricture via observation by laparoscopy and observation by ureteroscopy was feasible. In contrast to the use of a rigid ureteroscopy, flexible fiberoptic ureteroscopy did not require placing the patient in an unnatural position.

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1. Introduction

Ureteral stricture can occur because of long-term ureteral calculus and as a complication of transurethral lithotripsy (TUL). In ureteroureterostomy (UU), which is usually performed by laparoscopic or open surgery, the affected part of the ureter is surgically removed and reconnected to normal healthy ureteral tissue [1]. Recent reports have described UU via robotic-assisted surgery [2] and minimally invasive procedures such as laparoendoscopic single-site surgery (LESS) [3]. Laparoscopic UU requires accurate suture techniques, but it is difficult to precisely identify the location and length of a ureteral obstruction without the ability to determine tactile sensation. Here, we report a case of ureteral stricture that was precisely identified through the combination of super-slim flexible ureteroscopy and retroperitoneal laparoscopic UU in a patient who underwent TUL after laparoscopic partial nephrectomy.

2. Presentation of case

A 48-year-old man with an indwelling ureteral stent who underwent laparoscopic partial nephrectomy because of a right renal tumor (cT1aN0M0) immediately developed ureteral stricture because of ipsilateral ureteral calculus of the upper urinary tract and was admitted to our hospital. We performed transurethral lithotripsy 4 months after the partial nephrectomy. Because the portion of the ureter with the calculus had narrowed to the diameter of a pinhole, we performed TUL after dilating the ureter. Although endoscopic ureterostomy was performed twice, there was no improvement in the stricture (Fig. 1). Therefore, we performed retroperitoneal laparoscopic UU.

The patient was placed in the lithotomy position and a single pig-tail ureteral catheter was indwelled after removal of a double pig-tail ureteral catheter using a cystoscope. Subsequently, his posture was changed to the usual left decubitus position. The retroperitoneal cavity was accessed through a 30-mm skin incision above the anterior superior iliac spine in the mid-axillary line and was expanded by inflating a balloon. A 10-mm balloon trocar for a camera port was then inserted into this space, and three 5-mm trocars were placed around a camera (Fig. 2). The retroperitoneal space had an inordinate amount of adhesion because of repeated endoscopic urinary tract surgeries and prior laparoscopic partial nephrectomy. The right ureter, which was wrapped tightly in connective tissue, was identified and dissected over the great-

* Corresponding author at: Department of Urology and Endoscopic Surgery Center, Suzukake Central Hospital, Hamamatsu, Japan, 120-1 Tajiri-cho, Minami-ku, Hamamatsu 432-8054, Japan. Fax: +81 53 443 0112.

E-mail addresses: tsuru@suzukake.or.jp (N. Tsuru), mugiya@suzukake.or.jp (S. Mugiya), sige999sige000@msj.biglobe.ne.jp (S. Sato).

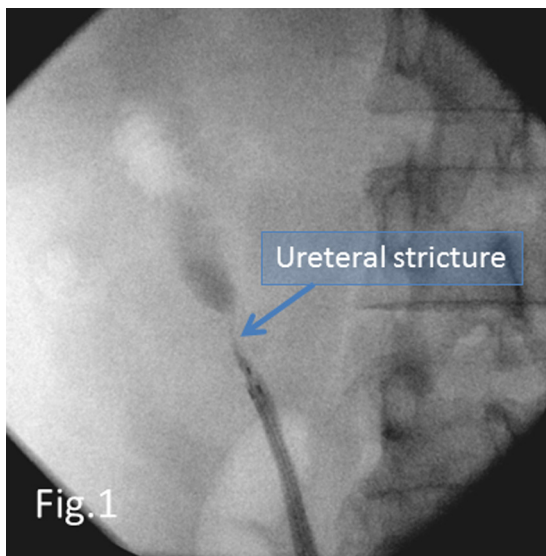


Fig. 1. Retrograde pyelography showed right ureteral stricture.

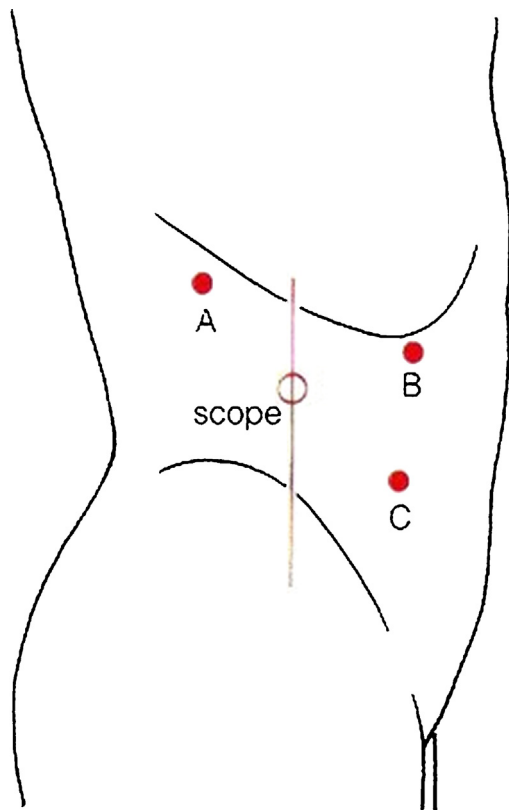


Fig. 2. Position of trocars during surgery: (scope) A 10-mm camera trocar above the anterior superior iliac spine on the mid-axillary line; (A) A 5-mm trocar the 12th rib on the posterior axillary line; (B) A 5-mm trocar the 12th rib on the anterior axillary line; (C) A 5-mm trocar on the anterior axillary line above the iliac crest.

est sufficient possible length. After the single pig-tail catheter was removed, a guide wire was inserted and a flexible fiberoptic ureteroscope (URF-P6; Olympus Corporation, Tokyo, Japan) was advanced into the ureteral stricture (Fig. 3). When the light source of the laparoscope was dimmed, the tip of the ureteroscope became visible (Fig. 4a,b). Abnormal ureteral mucosa was also identified by ureteroscopy. Only the guide wire was left in the ureter after the ureteroscope was retracted. The affected portion of the ureter was

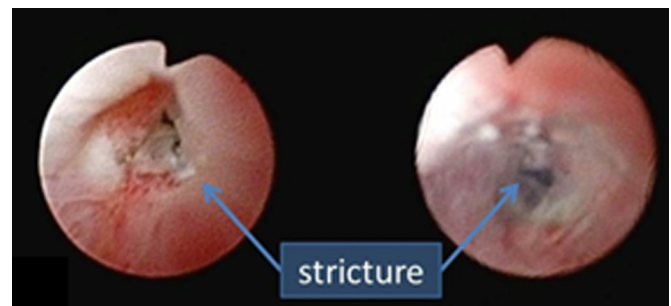


Fig. 3. Intraoperative ureteroscopic intraluminal view of the ureteral stricture.

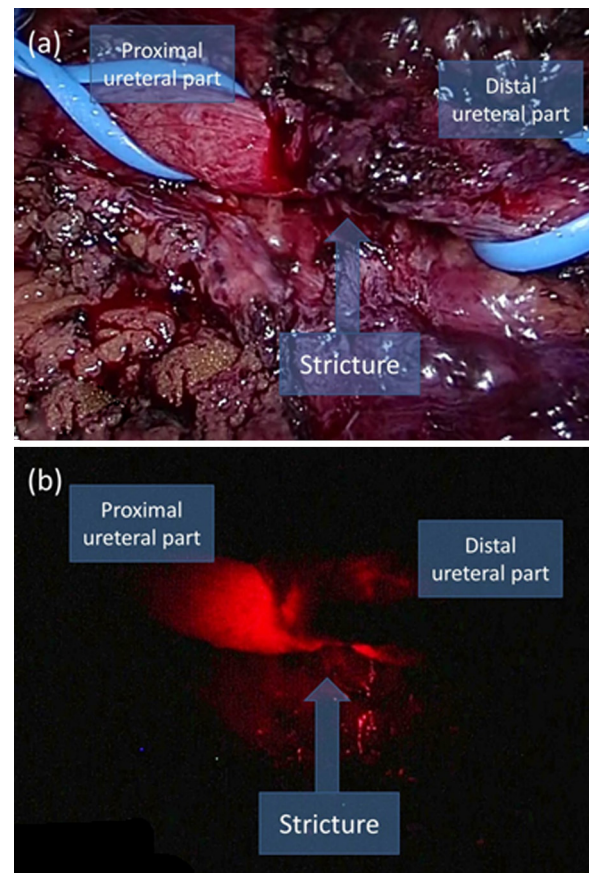


Fig. 4. Retroperitoneal laparoscopic view of the right ureter. Appearance of the ureteral stricture by the light source of a flexible ureteroscope.

resected by a length of 5 mm via laparoscopy and reanastomosis was performed using a running suture (Fig. 5).

The surgical duration was 436 min and the total intraoperative blood loss was ≤ 50 cc. Postoperatively, retroperitoneal fluid began to accumulate and then gradually disappeared without local infection. We removed the ureteral stent on postoperative week 10 and performed ureteroscopy at the same time to determine whether the ureteral obstruction reappeared. Neither hydronephrosis nor excretion delay in drop infusion pyelography was observed. In addition, no symptom such as flank pain was noted at a 3-month follow up.

3. Discussion

Laparoscopic UU has been reported for the treatment of benign ureteral strictures, iatrogenic injury during gynecological surgery, and retrocaval ureter [1,4]. UU is traditionally performed through

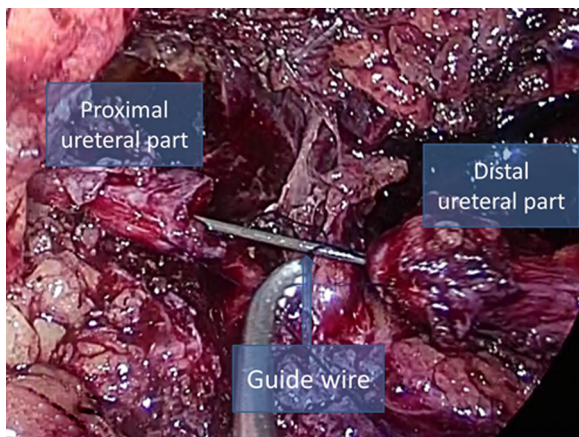


Fig. 5. After the affected portion of the ureter was resected, laparoscopic UU was performed using a running suture.

open surgery, but it has recently been increasingly performed through several minimally invasive techniques, including laparoscopic, robot-assisted, and LESS UU [1–3]. The portion of the affected ureter must be completely removed surgically, although only a minimum length should be excised. Achievement of tension-free anastomosis is the key step in successful UU [5]. Because there is no tactile sensation to guide laparoscopic surgery, it is sometimes difficult to identify the length of the ureteral stenosis by a laparoscopic view from the outside of the lumen.

Chow et al. reported an observation method using a rigid ureteroscope during laparoscopic surgery to identify a stricture [6]. Tang et al. reported the use of rigid ureteroscope during LESS UU and described the availability of this instrument in developing countries; thus, this technique may have widespread applicability [3]. However, it is necessary to place the patient in the lithotomy position when using a rigid scope and if the laparoscopic procedure is combined with the lateral decubitus position, the acrobatic posture must be employed. In addition, in males, it may be difficult to reach the upper urinary tract with a rigid ureteroscope.

Buffi et al. reported the use of a flexible ureteroscope to transilluminate ureteral strictures during robot-assisted UU [7]. It is not necessary to place the patient in the lithotomy position if a super slim flexible ureteroscope is used, as in our case. Also, it is relatively easier to reach the top of a ureteral stricture with ureteroscope using a wire guide. Baldie et al. reported that normal saline can be injected intraoperatively through a ureteral catheter to establish hydronephroureter and facilitate identification of the stricture length during robotic laparoscopic UU [8]. It is possible to obtain the same effects by injecting saline for observation during ureteroscopy.

We employed a retroperitoneal approach, in which the ureteral stricture can be directly reached, and even if urine leakage occurs, fluid collection is limited to the retroperitoneal space. As a disadvantage, the retroperitoneal working space is small and the suturing procedure is particularly very difficult, although less so if the laparoscopic surgeons are skilled.

To the best of our knowledge, this report is the first of retroperitoneal laparoscopic UU using a flexible ureteroscope.

4. Conclusion

While laparoscopic UU of the urinary tract is very difficult after

repeated surgery and chronic inflammation, it is a safe and effective minimally invasive procedure for treatment of refractory ureteral stricture. If the location and length of the stricture can be accurately estimated, we can resect the affected portion of the ureter without resecting the healthy portion. Therefore, it is possible to precisely identify the ureteral stricture by an extra- and intraluminal view by the light source of a flexible ureteroscope.

Conflicts of interest

None declared.

Funding

None.

Ethical approval

Because this case report is not a research study of patients, ethics committee has not been involved.

Consent

I have gained the agreement to publish a case report from the patient.

The patient has provided permission to publish these features of his case, and the identity of the patient has been protected.

Authors' contribution

Soichi Mugiya; modification of paper, co-operator.
Shigenori Sato; co-operator.

Guarantor

Nobuo Tsuru.

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